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Сборник содержит материалы XVIII Международной научно-технической конференции «Оптико-электронные приборы и устройства в системах распознавания образов и обработки изображений», целью которой является ознакомление с имеющимися достижениями по созданию оптико-электронных приборов, систем и внедрению информационных технологий в научные исследования, учебный процесс и промышленность, а также координация по эффективному их применению в системах распознавания образов и обработки изображений.

Сборник предназначен для научных сотрудников, преподавателей, аспирантов и студентов вузов.

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СОДЕРЖАНИЕ

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Ontological model of patient-centered medical digital twin

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Abstract. *The thesis demonstrates information about medical digital twin and highlights their advantages.A patient-centered ontology of healthcare is proposed, and a four level ontology model is built to create its digital twin.*

Keywords: *ontological models; patient-centered medical digital twin.*

Providing citizens with high-quality and safe medical services, improving the quality of medical care, increasing accessibility to medical information, and ensuring patient satisfaction have necessitated the development of methods and tools for medical and managerial decision-making [1]. To achieve these goals, a wide range of modern technologies have emerged [2].

Healthcare is considered to be one of the promising areas where digital twin (DT) technologies may have a revolutionary impact. DT is designed to provide more effective medical interventions and help physicians and medical technologies understand the patient's health status [3]. One of the main conditions for the application of DT in medicine is the availability of its physical object in the real world. A medical DT is a dynamic digital model that contains all the input data about a physical object or medical system. Medical digital twins can be used to solve many problems in healthcare. They may include early diagnosis of any disease in the initial stag e and monitoring of subsequent development trajectories, optimization of the time of medical assistance, development of personalized medicine, identification of drug effect mechanisms, etc.

The development of a complete DT of health care is a long-term and step-by-step process. The development of such a DT requires an ontological analysis of health care in terms of personnel, material, management and financial provision along with patient-centered medicine and the creation of an appropriate DT.In the healthcare sector, being heterogeneous, medical data is collected from various sources, and there is a need to understand the common semantics of this data. A possible solution to this semantic interaction problem is possible by using an ontological approach. The creation of a patient-centered digital twin of healthcare requires the creation of a digital twin of existing physical objects at each level of its ontological model.

Ontology is a set of general and specific terms with a hierarchical structure used to describe and present the subject area [4]. The task of ontologies is to maximally represent the semantics, properties and inter-word relations of terms. In

recent years, standardized ontologies have been developed in many fields. However, each ontology depends on the subject area, its specific components and the semantic relations between them. Taking these factors into account, an ontological model of patient-centered medical DT in the healthcare system is proposed. Fig. describes the four-level hierarchical architecture of the ontological model.
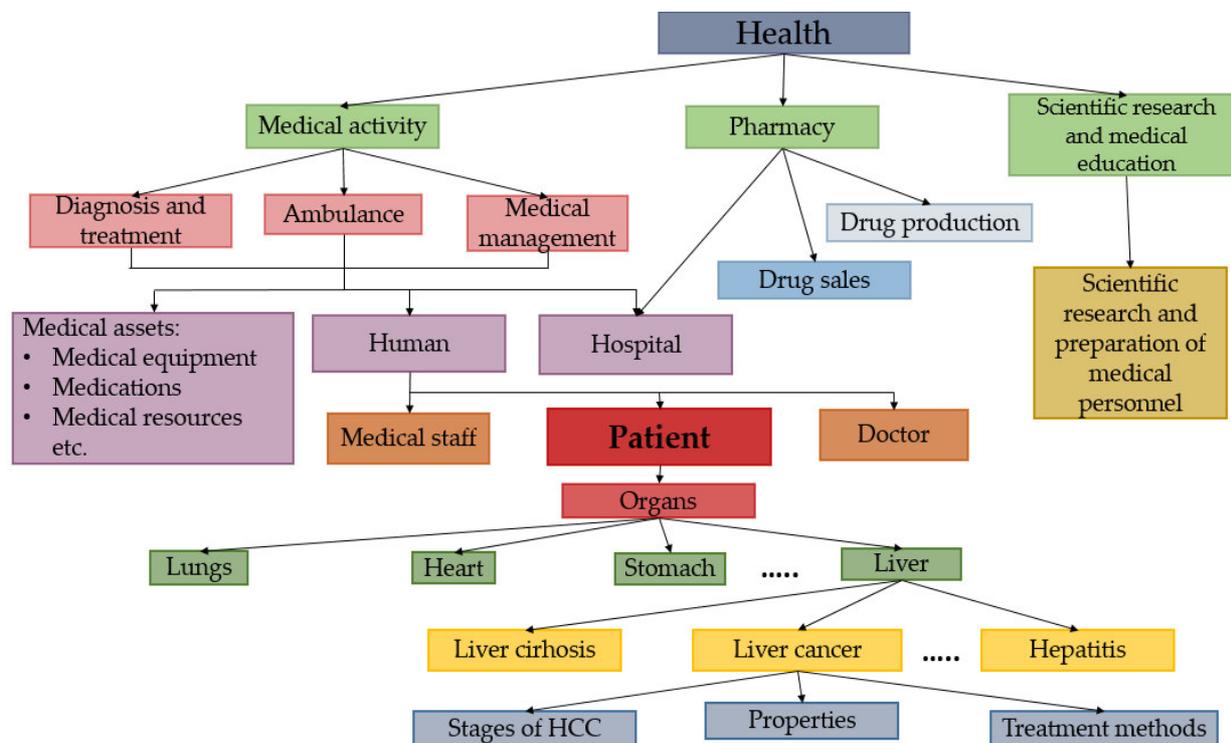

Fig. Ontological model of patient-centered medical DT

It is possible to create a patient-centered medical DT in a healthcare system with levels by referring to the ontological model described above. Level I is called the healthcare level of the ontological model. It includes medical activity, pharmacy, medical education. Level II is the subject level, which includes departments such as ambulatory care, emergency care, dentistry, medicine production and medicine sales. Based on Levels III and IV of patient-oriented medical DT, current researches are conducted in the sphere of developing a DT on individual human organ and diseases related to these organ. For this purpose, the patient's DT was constructed in the example of liver cirrhosis on the Power BI platform, a visualization tool.

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Sentiment analysis of information from social media resources for determining public opinion on the effectiveness of drugs

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Abstract. *This article highlights solution of the problem of determining the medications' effectiveness based on sentiment analysis of patient reviews collected in the medical segment of social media. To analyze patient reviews about drugs, lexicon-based sentiment analysis, statistical methods and machine learning algorithms are applied.*

Keywords: *sentiment analysis; social media resources.*

In recent years, data collected on digital platforms has become an important source of information for determining public satisfactionPatient reviews collected on medical social networks, websites, blogs, and various online platforms regarding physicians, nurses, clinics, medicines, etc. represent public opinion about media subjects, support medical decision-making based on their analysis, and act as one of the factors shaping public health [1; 2]. Thus, regular analysis of patient reviews is becoming an important tool for increasing transparency in the healthcare sector and further improving services [3].

The purpose of the present study is to determine public opinion about the effectiveness of drugs based on reviews about drugs. Therefore, patient reviews (text-type comments) of patients about the effectiveness, side effects and use of drugs are analyzed.

The problem is solved in the following stages:

Stage 1. An open database called drugsComTest_raw.csv from Kaggle is selected for the reviews analysis [4]. At this stage, Data Pre-Processing is applied to analyze the raw text data, and the data is converted into a usable form.